Rejection Under 35 U.S.C. § 103(a)

The Examiner has maintained the rejection of claims 1-10 under 35 U.S.C. § 103(a) as unpatentable over Dorn, et al., (U.S. Patent No. 6,232,328) (paper No. 12, pages 2-4). Applicants respectfully traverse.

The Examiner states that

> "Dorn et al teach the combination of pyrethroid and nicotinylic compound for the control of parasitic insects such as fleas, lice and flies, which embrace presently, claimed invention." (Paper No. 12, page 3).

Furthermore, the Examiner also states that

> "It would have been obvious to one skilled in the art at the time of invention to prepare additional beneficial compositions for controlling insects because prior art teaches control of insects by the same combination of compounds taught by the prior art. Since the synergistic combination is taught by the prior art therefore there is a motivation to prepare the formulation for controlling insects." (Paper No. 12, page 3).

However, the present invention relates to compositions and methods for controlling parasitic insects and <u>acarids</u> comprising a combination of synergistic effective amounts of a pyrethroid and a chloronicotinyl compound. Dorn, et al., does not teach or suggest the combination of a pyrethroid and nicotinylic compound for the control of insects and <u>acarids</u>. In fact, Dorn, et al., only describes insects such as Anoplura (sucking lice), Mallophaga (biting lice), Diptera (flies), and Siphonaptera (fleas) (see column 6, lines 31-49). Dorn, et al., does not teach or suggest acarids such as ticks and mites as described in the present invention. As one skilled in the art would appreciate, insects and acarids are distinctly different species. Indeed, insects such as fleas, lice, and flies are members of the Class Insecta, Subphylum Uniramia; whereas acarids such as ticks and mites are members of Class Arachnida, Subphylum Chelicerata (*see, e.g.*, Zoo Lab, University of Wisconsin, and Animal Diversity Web, University of Michigan; copies enclosed). There are distinct anatomical and physiological differences between these classes. Thus, one skilled in the art would easily recognize that compounds that demonstrate activity against insects do not necessarily possess activity against acarids. Therefore, based on the disclosure of Dorn, et al., it would not have been obvious to one skilled in the art to use a pyrethroid and a chloronicotinyl compound to control insects and acarids.

Furthermore, one skilled in the art would not have been motivated to combine a pyrethroid and a chloronicotinyl compound with the requisite reasonable expectation of success. That is, Dorn, et al., does not teach or suggest that the combination of a pyrethroid and a chloronicotinyl compound would demonstrate activity against insects and acarids. Based on the disclosure of Dorn, et al., one skilled in the art would not have known that this combination, a pyrethroid and a chloronicotinyl compound, would provide such an effect. Thus, Dorn et al., does not teach or suggest the compositions or methods of the

present invention and the requisite reasonable expectation of success is absent, that is, effective activity against insects and acarids.

Thus, the reference does not teach or suggest every element of the claimed invention, and therefore, does not support a rejection of the claims under U.S.C. § 103(a). Furthermore, it would not have been obvious to one skilled in the art, based on the disclosure by Dorn, et al., to combine a pyrethroid and a chloronicotinyl compound with the expectation of producing synergistic activity, that is, enhanced and prolonged activity against insects and acarids.

It is therefore respectfully submitted Dorn, et al., fail to teach or suggest the compositions or methods as presently claimed, and that the current invention is novel and nonobvious in view of the prior art references. For the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the present rejection.

CONCLUSION

For the foregoing reasons, Applicants submit that the claims are in condition for allowance and Applicants respectfully request reexamination of the present application and reconsideration and withdrawal of the present rejections. Should there be any further matter requiring consideration, Examiner Qazi is invited to contact the undersigned counsel.

If there are any further fees due in connection with the filing of the present reply, please charge the fees to undersigned's Deposit Account No. 13-3372. If a fee is required for an extension of time not accounted for, such an extension is requested and the fee should also be charged to undersigned's deposit account.

Respectfully submitted,

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Date: December 24, 2003

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UW-L

Zoo Lab: A Website for Animal Biology

Taxonomy of the arthropods

Although not all biologists feel that they should be lumped into a single group, the following provides a convenient way of classifying the most common divisions of the Phylum Arthropoda:

- **Subphylum Trilobita: trilobites (extinct)**
- **Subphylum Chelicerata: chelicerates**
  - **Class Merostomata: horseshoe crabs**
  - **Class Pycnogonida: sea spiders**
  - **Class Arachnida: spiders, scorpions, ticks, mites, etc.**
- **Subphylum Crustacea: crustaceans**
  - **Class Malacostraca: isopods, amphipods, decapods**
  - **Class Branchiopoda: brine shrimp, water fleas (*Daphnia*)**
  - **Class Copepoda: copepods**
  - **Class Cirripedia: barnacles**
- **Subphylum Uniramia: uniramians**
  - **Class Diplopoda: millipedes**
  - **Class Chilopoda: centipedes**
  - **Class Insecta: insects**

This site was last modified July 22, 2002. *Note*: This page is best viewed at a screen size of 800 X 600 pixels
The address of ZooLab is: http://www.bioweb.uwlax.edu/zoolab/ Direct comments or questions to gillis.rick@uwlax.edu

Insecta

With around one million named species and perhaps several times that number unnamed, insects account for a great majority of the species of animals on earth. They are a tremendously successful group. Insects can be found in almost all terrestrial and freshwater habitats, from the driest deserts to freshwater ponds, from the canopy of a tropical rainforest (where their diversity is unbelievably great) to the arctic wastes. A few species are even marine. Their feeding habits are similarly varied; almost any substance that has nutritive value is eaten by some group of insects.

Insects also show huge variety in shape and form. Almost the only condition their group does not attain is very large body size. A number of features, however, are shared by most kinds of living insects. In addition to the general characteristics of uniramians, these include a body composed of three tagmata, a head, thorax, and abodmen; a pair of relatively large compound eyes and usually three ocelli located on the head; a pair of antennae, also on the head; mouthparts consisting of a labrum, a pair of mandibles, a pair of maxillae, a labium, and a tonguelike hypopharynx; two pairs of wings, derived from outgrowths of the body wall (unlike any vertebrate wings); and three pairs of walking legs.

Insects have a complete and complex digestive tract. Their mouthparts are especially variable, often complexly related to their feeding habits. Insects "breathe" through a tracheal system, with external openings called spiracles and increasingly finely branched tubules that carry gases right to the metabolizing tissues. Aquatic forms may exchange gases through the body wall or they may have various kinds of gills. Excretion of nitrogenous waste takes place through Malpighian tubules. The nervous system of insects is complex, including a number of ganglia and a ventral, double nerve cord. The ganglia are largely independent in their functioning; for example, an isolated thorax is capable of walking. Yet ganglia also use sensory output. A grasshopper with one wing removed can correct for this loss and maintain flight, using sensory input from its brain. Sense organs are complex and acute. In addition to ocelli and compound eyes, some insects are quite sensitive to sounds, and their chemoreceptive abilities are astounding.

Insects are dioecious and fertilization is internal in most. The ways in which mating is accomplished, however, are incredibly variable; study of this variability by evolutionary biologists has greatly advanced our understanding of the evolution of behavior, social evolution, and traits such as number, size of young and patterns of investment in them. Reproduction by insects often involves a male locating a receptive female through chemicals (pheromones) released by the female. In most species, females store the sperm in a special receptacle in their abdomens; even species that lay huge numbers of eggs (in honeybees, for example, the number may be over one million), females mate only once and rely on sperm stored during that mating for the rest of their lives.

The manner in which growth is accomplished is an especially important characteristic of insects. In some, hatching eggs produce miniature adults, which to grow must shed their exoskeleton in a process called ecdyisis. In almost 90% of insect species, however, newly hatched young are completely different in appearance from adults. These larval forms usually live in different habitats, eat different foods, and assume a body form completely different from that of their parents. The larva feeds and grows, molting its skin periodically. At some point larval growth is completed, the larva stops feeding and builds a case or cocoon around itself. In this nonfeeding condition it is called a pupa or chrysalis. While so encased, the larva undergoes a complete transformation or "metamorphosis" of its body form, and a fully-formed adult emerges. Insects that experience this sort of complete change are called "holometabolous." Other species

undergo a more gradual process, in which the newly hatched young are more similar to the adult but are small in size, lack wings, are sexually immature, and may differ in other, relatively minor ways as well. The young in these insects are called nymphs, and the lifestyle is referred to as "hemimetabolous."

Insects are incalculably valuable to man. Usually, we think of them in a negative context. Insects eat our food, feed on our blood and skin, contaminate our dwellings, and transmit horrible diseases. But without them, we could not exist. They are a fundamental part of our ecosystem. A brief and incomplete list of their positive roles would include the pollination of many, perhaps most higher plants; the decomposition of organic materials, facilitating the recycling of carbon, nitrogen, and other essential nutrients; the control of populations of harmful invertebrate species (including other insects); the direct production of certain foods (honey, for example); and the manufacture of useful products such as silk and shellac.

There is no general agreement on the details of how different groups of insects are related. The following is modified from the scheme used by Professor Alexander in class:

- Entognatha
  - Diplura
  - Collembola (springtails)
  - Protura
- Insecta
  - Microcoryphia
  - Thysanura (silverfish)
  - Paleoptera
    - Ephemeroptera (mayflies)
    - Odonata (dragonflies)
  - Neoptera
    - "Orthopteroids"
      - Grylloblattaria
      - Phasmida (stick and leaf insects)
      - Orthoptera (grasshoppers, crickets, katydids)
      - Mantodea (mantises)
      - Blattaria (cockroaches)
      - Isoptera (termites)
      - Dermaptera (earwigs)
      - Embiidina
      - Plecoptera (stone flies)
    - "Hemipteroids"
      - Zoraptera
      - Psocoptera (book and bark lice)
      - Phthiraptera
      - Heteroptera (true bugs)
      - Homoptera (cicadas, aphids, scale insects)
      - Thysanoptera (thrips)
    - Holometabola
      - Neuroptera (lacewings, ant lions, dobsonflies, etc.)
      - Coleoptera (beetles)
      - Strepsiptera
      - Mecoptera (scorpion flies)
      - Siphonaptera (fleas)
      - Diptera (flies)
      - Trichoptera (caddisflies)
      - Lepidoptera (moths and butterflies)
      - Hymenoptera (ants, bees, wasps)

Other Web Resources:

- Interactive key to the insects, University of Delaware

References:

1. Hickman, C.P. and L. S. Roberts. 1994. *Animal Diversity*. Wm. C. Brown, Dubuque, IA.
2. Brusca, R. C., and G. J. Brusca. *Invertebrates.* 1990. Sinauer Associates, Sunderland, MA.
3. Pearse, V., J. Pearse, M. Buchsbaum, and R. Buchsbaum. 1987. *Living Invertebrates.* Blackwell Scientific Publications, Palo Alto, Ca.

Written by Philip Myers; last updated 1 February 1998.

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Sponsored in part by the Interagency Education Research Initiative, the Homeland Foundation and the University of Michigan Museum of Zoology.
The ADW Team gratefully acknowledges their support.

Arachnida

This large Class of arthropods includes over 60,000 described species (and most likely a very large number of so-far undescribed ones). Spiders make up the majority of these (over 50,000 described species); with mites and ticks next largest (around 48,200 species). The Arachnida also includes a diverse array of smaller groups, including scorpions (1200 species), whip scorpions (100 species), palpigrades (60 species), pseudoscorpions (2000 species), solpugids (900 species), and harvestmen (5000 species). Nearly all species are terrestrial.

Arachnids have a pair of tagmata called a prosoma and opisthosoma. The prosoma is partially or completely covered with a carapace-like shield. The opisthosoma may be segmented or unsegmented. The appendages on the opithosoma are absent or modified, being used as spinnerets (spiders) or pectines (probably sensory in function, found in scorpions). Respiration is via tracheae or book lungs; it is cutaneous in many small arachnids.

The Arachnid Class contains the following orders:

Eurypterida (extinct)
Scorpiones -- scorpions
Pseudoscorpiones (Chelonethida)
Opiliones (Phalangida) -- daddy long legs
Uropygi -- whip "scorpions", vinegaroon
Amblypygi -- tailless whip scorpions
Schizomida
Palpigradi
Solifugae (Solpugida) -- sun "spiders", wind "scorpions"
Ricinulei
Araneae -- spiders

The Acari (unranked, but within Class Arachnida) includes the following orders:
Parasitiformes -- ticks and parasitiform mites
Acariformes -- acariform mites

Animal Diversity Web has information on the following species:

- *Order Acari*
  - *Family Ixodidae*
    - *Dermacentor variablis (American Dog Tick)*
- *Order Aranae*
  - *Family Salctidae*
    - *Portia fimbriata (jumping spider)*
- *Order Araneae*
  - *Suborder Labidognatha*
    - *Family Theridiidae*
      - *Latrodectus mactans (Black Widow Spider)*
    - *Family Araneidae*

Araneus diadematus -t-

Argiope aurantia (Yellow Garden Spider) -pt-

Argiope trifasciata -p-

Nephila clavipes (golden silk spider) -t-

▽ *Family Agelenidae*

Atrax robustus (Sydney Funnel-web Spider) -t-

▽ *Family Araneidae*

Araneus diadematus -t-

Argiope aurantia (Yellow Garden Spider) -pt-

Argiope trifasciata -p-

Nephila clavipes (golden silk spider) -t-

▽ *Family Loxoscelidae*

Loxosceles reclusa (Brown Recluse, the Violin Spider) -t-

▽ *Family Pisauridae*

Dolomedes triton -t-

▽ *Family Thomisidae*

▽ *Subfamily Misumeninae*

Misumena vatia (Goldenrod Spider, Flower Spider) -t-

▽ *Order Aranene*

▽ *Family Theraphosidae*

Brachypelma smithi (Mexican Redknee Tarantula) -pt-

▽ *Order Scorpiones*

▽ *Family Buthidae*

Centruroides vittatus (Striped Scorpion) -t-

▽ *Order Uropygids*

▽ *Family Thelyphonidae*

Mastigoproctus giganteus (Giant Whipscorpion) -t-

Accounts marked with a [p] contain pictures, [t] contain narrative text (student authored), [a] contain anatomical still/QTVR images, and [s] contain digitized sound clips.

Sources:

1. *Hickman, C.P. and L. S. Roberts. 1994. Animal Diversity. Wm. C. Brown, Dubuque, IA.*
2. *Brusca, R. C., and G. J. Brusca. Invertebrates. 1990. Sinauer Associates, Sunderland, MA.*
3. *Pearse, V., J. Pearse, M. Buchsbaum, and R. Buchsbaum. 1987. Living Invertebrates. Blackwell Scientific Publications, Palo Alto, Ca.*

Written by Philip Myers; last updated 1 February 2001 by Cyndy Sims Parr.

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The ADW Team gratefully acknowledges their support.